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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/849,537	05/07/2001	Tonglong Zhang	1875.0370000	7984
7590	08/11/2004		EXAMINER	
STERNE, KESSLER, GOLDSTEIN & FOX P.L.L.C. Suite 600 1100 New York Avenue, N. W. Washington, DC 20005-3934			LEWIS, MONICA	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 08/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/849,537	ZHANG ET AL.	
	Examiner Monica Lewis	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 21 May 2004.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 3,4,6,7,9,10,12,13,16,17 and 38-64 is/are pending in the application.
- 4a) Of the above claim(s) 3,4,6,7,9,10,12,38-51 and 60-64 is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 13,16,17 and 52-59 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 07 May 2001 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____ .  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>2/6/04;5/28/04</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

1. This office action is in response to the election filed May 21, 2004.

### ***Election/Restrictions***

2. Applicant's election without traverse of Embodiment II in the reply filed on 5/21/04 is acknowledged.

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 13, 16, 17 and 52-59 have been considered but are moot in view of the new rejection.

### ***Continued Examination Under 37 CFR 1.114***

4. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/26/04 has been entered.

### ***Drawings***

5. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "substrate having a plurality of contact pads on a first surface electrically connected through said substrate to a plurality of solder ball pads on a second surface of said substrate" must be shown or the feature(s) canceled from the claim(s) (See Claims 6, 13 and 38). No new matter should be entered. **Applicant stated that replacement sheets were submitted however there are no replacement sheets in the application.**

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

***Claim Objections***

6. Claim 59 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 13, 16, 17 and 52-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Culnane et al. (U.S. Patent No. 5,744,863) in view of Jamieson et al. (U.S. Patent No. 6,545,351).

In regards to claim 13, Culnane et al. (“Culnane”) discloses the following:

a) a substrate (256) having a plurality of contact pads (254) on a first surface electrically connected through said substrate to a plurality of solder balls (259) on a second surface of said substrate (For Example: See Figure 5);

b) an integrated circuit die (252) that is mounted to said first surface of said substrate (For Example: See Figure 5);

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c) a ring shaped stiffener (262) being centrally open in a first surface and a second surface wherein said first surface of said ring shaped stiffener is attached to said first surface of said substrate (For Example: See Figure 5); and

d) die is mounted to said first surface of said substrate in a flip chip configuration, wherein a conductive bump (258) on an active surface of said IC die is connected to said first surface of said substrate (For Example: See Figure 5).

In regards to claim 13, Culnane fails to disclose the following:

a) a heat spreader that has a first surface and a second surface, wherein said first surface of said heat spreader is attached to said second surface of said substrate and wherein the second surface of said heat spreader is capable of being coupled to a printed circuit board..

However, Jamieson discloses a semiconductor device with a heat spreader (For Example: See Figure 4 and Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Culnane to include a heat spreader as disclosed in Jamieson because it aids in reducing thermal impedance (For Example: See Abstract).

Additionally, since Culnane and Jamieson are both from the same field of endeavor, the purpose disclosed by Jamieson would have been recognized in the pertinent art of Culnane.

In regards to claim 16, Culnane discloses the following:

a) a second heat spreader (270) attached to a non-active surface of said IC die and a said second surface of said ring shaped stiffener (For Example: See Figure 5).

In regards to claim 17, Culnane fails to disclose the following:

a) a via located proximate to said mounted IC die that extends through said substrate, wherein said via is filled with a conductive material to couple said conductive bump to said heat spreader.

However, Jamieson discloses a semiconductor device with vias (For Example: See Column 2 Lines 26-28). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Culnane to include vias as

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disclosed in Jamieson because it aids in providing an electrical connection (For Example: See Column 2 Lines 26-28).

Additionally, since Culnane and Jamieson are both from the same field of endeavor, the purpose disclosed by Jamieson would have been recognized in the pertinent art of Culnane.

In regards to claim 52, Culnane discloses the following:

a) second heat spreader is attached to said second surface of said ring shaped stiffener with a thermally conductive adhesive (272) material (For Example: See Figure 5).

In regards to claim 53, Culnane discloses the following:

a) second heat spreader is attached to said nonactive surface of said IC die with a thermally conductive adhesive material (274) (For Example: See Figure 5).

In regards to claim 54, Culnane discloses the following:

a) heat spreader comprises at least one metal (For Example: See Column 5 Lines 20-22).

In regards to claim 55, Culnane discloses the following:

a) at least one metal includes copper (For Example: See Column 5 Lines 20-22).

In regards to claim 56, Culnane discloses the following:

a) at least one metal includes aluminum (For Example: See Column 5 Lines 20-22).

In regards to claim 57, Culnane discloses the following:

a) second heat spreader is substantially planar (For Example: See Figure 5).

In regards to claim 58, Culnane fails to disclose the following:

a) conductive material filling said via thermally couples said conductive bump to said heat spreader.

However, Jamieson discloses a semiconductor device with vias (For Example: See Column 2 Lines 26-28). It would have been obvious to one having ordinary skill in the art at the

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time the invention was made to modify the semiconductor device of Culnane to include vias as disclosed in Jamieson because it aids in providing an electrical connection (For Example: See Column 2 Lines 26-28).

Additionally, since Culnane and Jamieson are both from the same field of endeavor, the purpose disclosed by Jamieson would have been recognized in the pertinent art of Culnane.

In regards to claim 59, Jamieson fails to disclose the following:

a) conductive material filling said via electrically couples said conductive bump to said heat spreader.

However, Jamieson discloses a semiconductor device with vias (For Example: See Column 2 Lines 26-28). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Culnane to include vias as disclosed in Jamieson because it aids in providing an electrical connection (For Example: See Column 2 Lines 26-28).

Additionally, since Culnane and Jamieson are both from the same field of endeavor, the purpose disclosed by Jamieson would have been recognized in the pertinent art of Culnane.

### ***Double Patenting***

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 13, 16, 17 and 52-59 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-13 of U.S. Application No. 09/997,272. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim a ball grid array package.

In regards to claims 13, 16, 17 and 52-59, Zhao et al. ("Zhao") discloses the following:

a) a substrate, solder balls and metal connector (For Example: See Claims 1-13).

11. Claims 13, 16, 17 and 52-59 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 11-13 of U.S. Application No. 09/984,259. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim a ball grid array package.

In regards to claims 13, 16, 17 and 52-59, Zhao et al. ("Zhao") discloses the following:

a) a substrate, stiffener and heat spreader (For Example: See Claims 1 and 11-13).

12. Claims 13, 16, 17 and 52-59 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-33 and 57 of U.S.

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Application No. 09/742,366. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim a ball grid array package.

In regards to claims 13, 16, 17 and 52-59, Zhao et al. ("Zhao") discloses the following:

- a) a substrate, stiffener and solder balls (For Example: See Claims 1-33).

13. Claims 13, 16, 17 and 52-59 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-17, 35 and 36 of U.S. Application No. 09/783,034. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim a ball grid array package.

In regards to claims 13, 16, 17 and 52-59, Zhao et al. ("Zhao") discloses the following:

- a) a substrate, stiffener, heat spreader and solder balls (For Example: See Claims 1-17, 35 and 36).

### ***Conclusion***

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 571-272-1838. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML  
August 5, 2004



**Mary Wilczewski**  
**Primary Examiner**